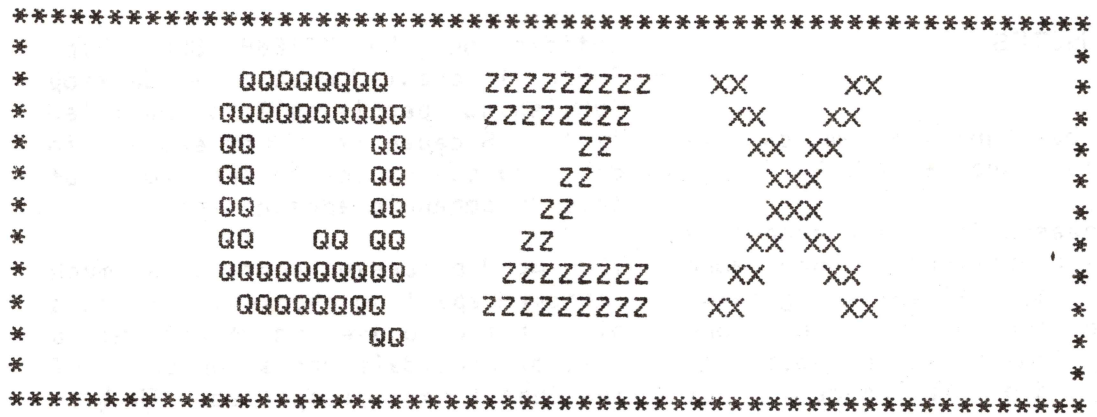
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The Journal Covering Amateur Radio & Sinclair Computers
ZX80; Micro-Ace; ZX81; TS1000, 1500, & 2068; QL; Z88
Alex. F. Burr, K5XY, Publisher
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EDITOR'S NOTES
K5XY

There have been quite a few changes made in this issue of QZX.

The main reason for the changes is that I have obtained a new word processor, or rather a greatly changed version of my old word processor. Some of the changes will not be noticed by the readers, but will make my job much easier. The biggest change is in the way which I create the two columns on this page. Before I had to block out the second column and move it into position. I could not then change anything without a great amount of effort. Also if I misjudged the number of lines in a column, it was difficult to rebalance the length of the two columns. As a result some esthetically unpleasing choices were not corrected. Now the lines of the columns can snake from one to the other and from page to page with no effort on my part. The result will be better page layout with less effort.

It is also much easier to make changes in the text after I have gotten it into column form. As a result it is now possible to make last minute changes and to correct small errors discovered just before the issue is printed.

Another change is the use of hyphenation. Before I just did not hyphenate any words because too much effort was involved. As a result some lines had really too many spaces between many words. This word processor has a good automatic hyphenator and I shall use it. The result will be more compact lines.

The new program also makes it easier to change the styles of different paragraphs. One result appears in next month's installment of the article on the TS1000 SCL chip. There I created what the desktop publishing people call a bulleted list. Because it is now easier to do, you can expect to see more of this typographic arrangement.

The word processor contains a much improved spelling checker. It is a bit easier to use and offers me a list of candidate words for each of the ones I have misspelled. This is a very useful and time saving feature for a bad spelled such as I. It saves me much time formerly spent looking words up in a dictionary. (I always wondered what good a dictionary did anyway. If you could not spell the word, how did anybody expect you to look it up in a book which required the correct spelling in order to find the word in the first place.)

Wow! In checking the spelling of these notes I just found that the spelling checker mechanics are better than I thought. I do not have a hard disk. That means I have to remove the word processor disk and replace it with the dictionary disk to check the spelling. I have been doing this all along; so that is not any extra work. But I have just found out that the memory of this computer is large enough that sometimes the word processor leaves the dictionaries in RAM after they have been used. Thus I have to swap disks only sometimes during an editing session. Maybe I can really cut down on the incidence of misspelled words in QZX.

The word processor also contains a thesaurus. Not having a hard disk means I have to swap floppies to use it too. Therefore I shall not, in practice, use it at all. The unfortunate result of this state of affairs is that you will not be exposed to as wide a variety of prose as you might otherwise expect.

I have enlarged the margins a little bit. I hope that this change will improve the readability of the magazine. I have also increased the difference between the inside and outside margins to make life easier for those readers who punch holes in QZX to permit the use of three ring binders for storage purposes.

In another effort to improve readability, I have changed the paragraph style. In this issue I no longer indent the first line of each new paragraph. Instead I have put an extra blank line between the paragraphs and started the first line flush with the left margin, the same as all the other lines.

I would like your opinion on this last change. Do you like the extra blank line or would you rather have an indented first line?

I would like to add a variety of type faces to the magazine. In particular I would like to use a proportional spacing type face for the body of the articles. It looks better, it avoids gullies of white space in long paragraphs, and permits more words per page. The new word processor supports proportional type and my printer has a proportional font, but much effort has no permitted me to get both these features working along with right justified margins. I will continue working on this problem, but I have little hope of success.

I do, however, hope to make other small layout improvements in future issues. Look for them.

I received an interesting letter just before this issue went to print. It was from a reader in Michigan who had purchased a TS1500 sold as "not working". He found that the machine actually works fine, but it had a "Tree-forth" ROM module in place of the normal ROM. The language sparked his interest but it is non-standard enough to leave him baffled. The original maker of the ROM has moved and left no forwarding address. If any reader as any information on this matter, I will be happy to forward it to him.

EXPLORING THE TS1000 SINCLAIR LOGIC CHIP (SCL) II

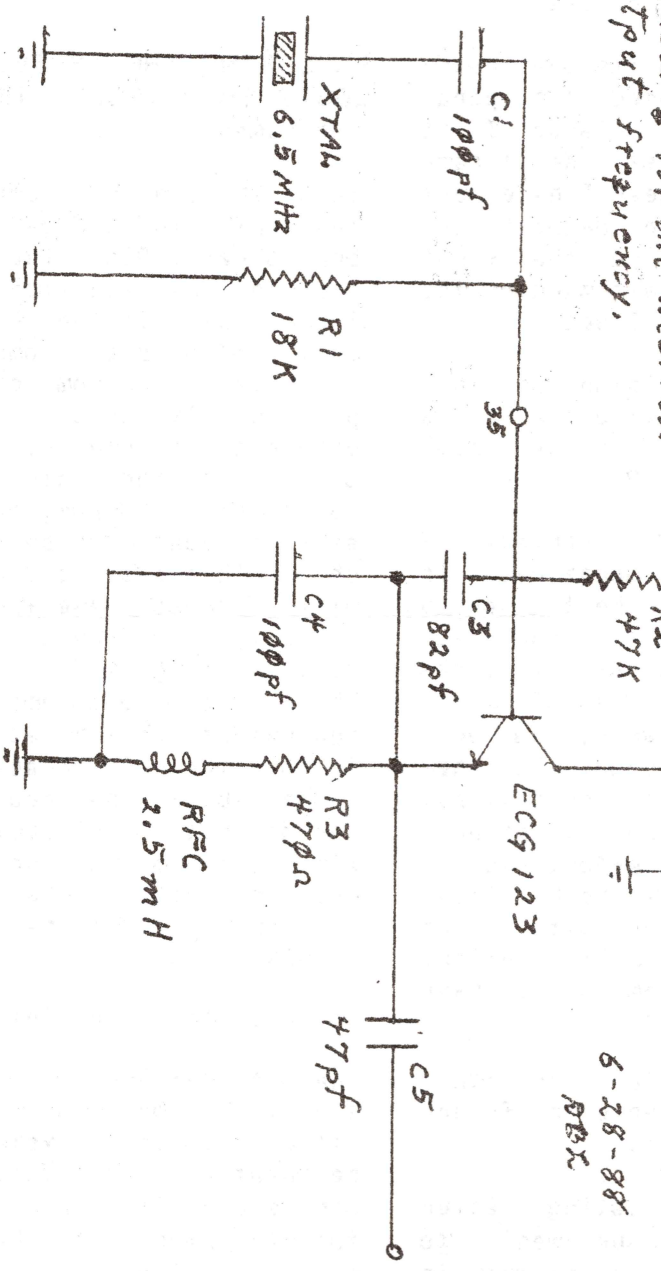
Don Lamen

This article is a continuation of the series which began in the October issue of QZX. The purpose is to explain the function of the SCL logic chip in the ZX and TS1000 series of Sinclair computers. This chip is a custom chip designed particularly for our computers. The previous article gave some background on the chip, provided a functional diagram, and listed 17 separate functions performed by the chip. This and succeeding articles will discuss these functions individually and provide an equivalent circuit diagram for the function. These circuit diagrams are only the equivalent of the actual circuits inside the chip because nothing is known about the real connections inside, but the circuits given here will perform the function of the real circuit. For a list of these 17 functions see the October issue of QZX.

Dot oscillator and internal clock

The dot frequency is controlled and stabilized by a 6.5 MHz ceramic filter used as a crystal in a series resonant circuit. This component, a series capacitor, and a shunt resistor are external to the SCL chip. A circuit diagram including these components and an equivalent oscillator circuit is shown on the next page. In this circuit the resistor (R1) across the crystal and the capacitor (C1) in series with the

SIMULATION of the DOT OSCILLATOR



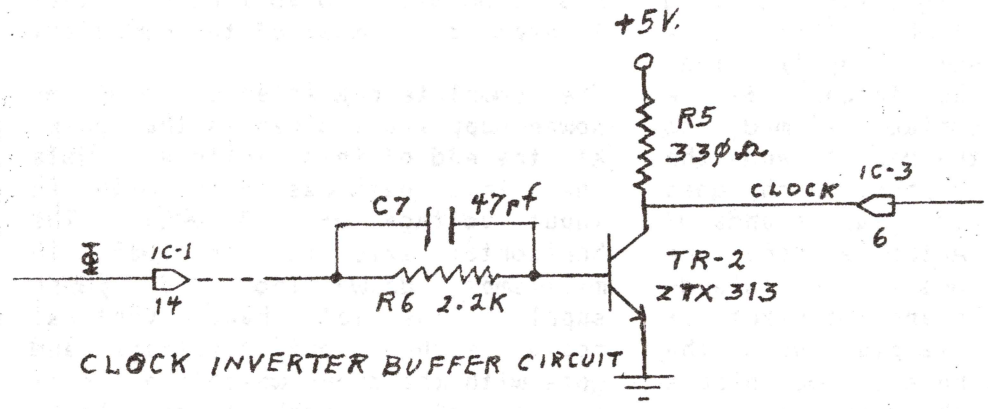
NOTE: The values given are for a starting point. R2, C3, and C4 may need adjusting for the desired output frequency.

6-28-88 DBX

(R1) across the crystal and the capacitor (C1) in series with the crystal lower the Q of the circuit thus broadening the resonance curve. This broadening helps to mask any jitter caused by switching within the chip. Also R1, in conjunction with R2, sets the bias and operating point of the transistor. The capacitors C3 and C4, effectively across the crystal filter, tend to lower the frequency of oscillation, while C1 tends to increase the frequency. The ratio of C3 to C4 determines the amount of feedback.

Microprocessor clock

The microprocessor clock is the dot frequency divided by two (3.5 MHz) and inverted. This frequency may be generated by a single flip-flop using the dot clock both as a clock and as an input signal.. However, it is probably taken from the first stage of the timing chain counters. External to the SCL chip is a circuit built around transistor TR2 which buffers the processor clock and re-inverts it. This external circuit is shown below. The timing chain circuit will be discussed in detail next month.



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TS2068 POWER SUPPLY

K5XY

This article reports on an investigation of the TS2068 power supply. The power supply tested was the usual plug-in wall transformer type labeled in large letters, DVE. It is a model DV-141A. I think that most of the power supplies which came with the TS2068 were of this type; although, because there are many suppliers of this variety of power supply, other makers may very well have been selected to provide this item.

The supply is large, heavy (but will just barely stick in a vertical wall socket that is in good condition), and comes with a light six foot long cord at the end of which there is a small two wire power supply plug. The plug is of the standard female type where one contact is made to the outside of the barrel and the other is made by a prong which goes up the center. Did I say standard? Which standard? Actually there are two major variations in the "standard" plug. There are two sizes of center post. This plug uses the bigger one. There are two places the plus side of the supply can go. This supply places the positive voltage on the outside conductor of the plug.

The ratings printed on the transformer say 120 V at 60 Hz 26 watts. The output is listed as 15 V at 1A. A quick calculation shows that the output is 15 watts, considerably less that the input wattage. An article similar to this one on the ZX81 power supply which appeared in the December 1982 issue of QZX showed that this difference appears as heat in the power supply.

Inside the plastic case you will find a transformer, four diodes in a bridge rectifier circuit, and a filter capacitor. The fact that the waveform of the ripple did not change as the current drawn from the power supply was increased to the maximum value shows that the size of this capacitor is adequate. This waveform was an asymetric triangular wave with the fall time about three times longer than the rise time.

Inside the computer you will find that the power is split into three parts. The unregulated voltage feeds three regulators and goes to two traces on the expansion port. One of the regulators is an UA78L12, a linear regulator which supplies 12 VDC. There are two 5 volt regulators. One of these is a pass transistor which can supply up to one amp. The other is a switching regulator with a 5 volt output that is used to run most of the computer.

The complete characteristics of my power supply are given in the graph at the end of this article. Note that this data was taken with an input voltage of 115 VAC. The horizontal axis is the load in milliamps drawn from the power supply. The left hand vertical scale is the DC output voltage and goes with the curve which runs from the top of the graph at the left, down towards the lower right hand corner. The right hand vertical scale is the peak-to-peak ripple voltage and goes with the curve that rises from the lower left hand side to the upper right hand side. The amount of current drawn from the power supply depends on whether the computer is working, using the tape recorder, or supplying some peripherals like a printer. The official specifications indicate that the computer should work correctly as long as the supplied voltage remains within the range of 25 to 14 volts.

A glance at this graph shows that the ripple increases from zero to a somewhat reasonable value at full load. Remember that there are

regulators inside the computer and that the input voltage, even with the large ripple, never drops below 14 volts, which is high enough that the 12 volt regulator will never drop out. The average output impedance of the power supply, calculated from the graph, is six ohms, a not unreasonable figure.

In any case this graph will be useful when planning any power supply related projects, like an uninterruptable power supply, or current drawing additions at the expansion connector. You might compare your power supply to mine. If you do, send me the results.

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FOR SALE: Many items for sale, including TS1000 computers, printer, 16K & 64K RAMs, printer interface, word processor, books, commercial tapes, etc. Long SASE for list. Marty Irons, K2MI, 46 Magic Circle, Goshen, NY 10924.

WANTED: One copy of 2068 VU-FILE on tape cassette w/documentation. Write or call: John A. Sampson, 23-51 123 Street, College Point, NY 11356: 718-961-2859: 7-11 PM.

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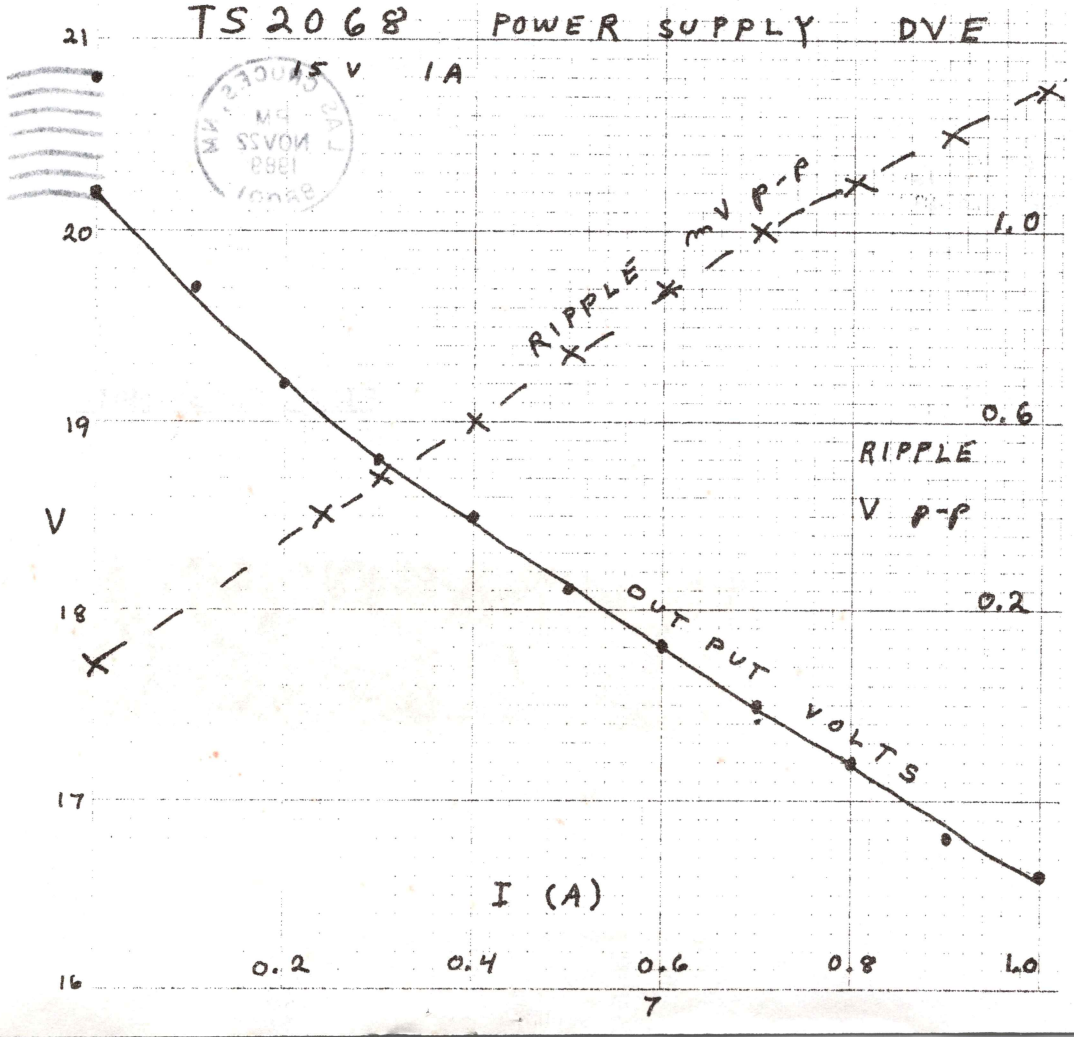

73, K5XY

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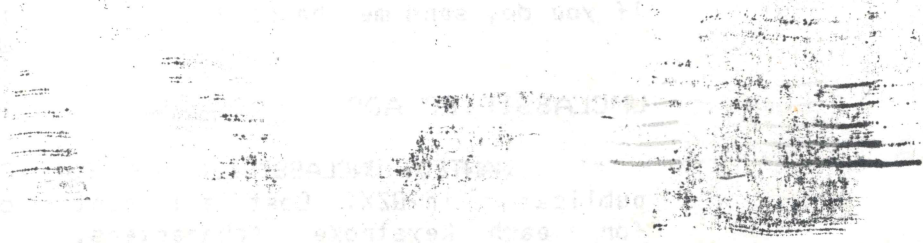

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